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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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David L. Hagen

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EXAMINER

SOOHOO, TONY GLEN

ART UNIT

PAPER NUMBER

1797

MAIL DATE

DELIVERY MODE

01/13/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/686,191	Applicant(s) HAGEN ET AL.	
	Examiner Tony G. Soohoo	Art Unit 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11/12/2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 56-98 is/are pending in the application.
- 4a) Of the above claim(s) 60-64 and 84-95 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 56-59, 65-83, 96 and 97-98 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Claims 60-62; 63-64, and 84-95 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a provisionally non-elected species or an invention non-elected without traverse, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 11/13/2007.
2. The elected species was elected to species b2 the use of a high voltage power supply

Claim interpretation

3. The independent claim 56 states in the line 17 “**are configured** to deliver at least one of a prescribed non-uniform [transverse/ streamwise] distribution of [fluids/ or fluid ratio]... .” Whereby the "configured to deliver at least one of a prescribed non-uniform ... distribution" is directed to the an effect of the location, size ,density and orientation of the orifices, and is a dependent effect in response to the type of fluids, pressures, and temperature effects passing through the orifices, it is understood and considered by the examiner that any provision of a non-uniform orifice location/size/orientation distribution would inherently provide the recited prescribed manner of operation to the fluids as recited by the claim.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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5. Claims 56-59, 70-76, 78-82, and 96-98 are rejected under 35 U.S.C. 102(b) as being anticipated by Woilles et al 4859071.

6. The Woilles et al (et al) reference discloses

- a. a fluid delivery system
- b. a duct 2
- c. an elongated fluid contactor 8, 10, 12, 16, 18, 14
 - i. an inlet 32
 - ii. a plurality of outlet orifices 20, 22, 26 (fig 2) in the elongated fluid contactor

(1) where the orifice distributions, along a 1st curvilinear transverse direction along a surface of the contactor is one of

- (a) non-uniform spatial location (see location of 26 compared to 20, 22, fig 1)
- (b) non-uniform size
- (c) non uniform orientation (see arrows fig 2)

A desired flow distribution of the 1st fluid is provided by a plurality of outlet orifices nozzles, which as seen in figures 1 and 2, by a non-uniform distribution of spatial location and orientation.

The elongated fluid contactor and support 8, 16, 18 is made of a flexible sheet steel tubing, column 5, lines 45-48, and lines 55-56.

The structural of the elongated fluid contactor as shown by the reference is considered capable to function in a desired flow distribution of 1st fluid is

provided by a plurality non-uniform spaced orifices 3, and on 5 or 4, in any distribution.

Note that the fluid contactor tube is formed from a conical, curved, thin walled tubular member extending transverse and along parallel in curvature into the flow path of the 2nd flow. There is also an elongation section 18 along the path of the pipe 2. Each of the elongation sections have a curvature radii along the length as seen in figs 1 and 2.

With regards to the mass flow rate volumes of flow, the flow rates provided of the 1st and 2nd flows are dependent upon the flow pressures operated by the device and does not distinguish the apparatus in a structural sense.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 68-69, 77, and 83 are rejected under 35 U.S.C. 103(a) as being unpatentable over Woilles et al 4859071 .

The Woilles et al 4859071 reference discloses all of the recited subject matter as established above with the exception of 1) the particular numerical value of the area and diameter of the Woilles' orifices (claims 68-69), 2) the

orifices being of a non-uniform size distribution (claim 77), 3) the wall with the orifices being of a thinner wall portion than the other parts of the fluid contactor.

Regarding the first issue of the numerical values of orifice area and diameter, It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the area and diameter of the orifices so as to provide an effective ratio portion of material flow into the duct, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding the second issue of the orifices of a non-uniform size distribution, it would have been an obvious matter of design alter the sizes of the nozzles to a non-uniform distribution of sizes so as to optimize the material flow across the cross section of the duct for a more effective and rapid mixing, since such a modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. In re Rose, 105 USPQ 237 (CCPA 1955).

Similarly, regarding the last issue of the contactor wall being thinner in the orifice section than the other portions of the contactor wall, it would have been an obvious matter of design choice to alter the thickness of the steel sheet tubing to be a smaller thickness at the orifice section so as to lower material costs, since such a modification would have involved a mere change in the size of a

component. A change in size is generally recognized as being within the level of ordinary skill in the art. In re Rose, 105 USPQ 237 (CCPA 1955).

8. Claims 65-67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Woilles et al 4859071 in view of Tsouris et al US 2003/0086333 and Paine 3570513

9. The Woilles et al 4859071 reference discloses all of the recited subject matter as established above with the exception of the fluid delivery system comprising a high voltage power supply to establish an electric field modifying the flow of the 1st fluid delivered by the orifices.

10. The phenomenon of electrohydrodynamic (EHD) effect in cooperation in a control of fluid flow is old and well known in the art of fluid control and mixing. This is evidenced by the 1971 patent of Paine, US 3570513 in which high voltage is provided across electrodes for produce an electric field to affect fluid flow as use as a electrohydrodynamic control valve. Furthermore, the use of (EHD) techniques (and control) has been proposed within a channel flow assisting the mixing of fluids, See Tsouris et al US 2003/0086333. In light of the knowledge gleaned by the prior art, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to further provide the fluid delivery system with a high voltage power supply to establish an electric field modifying the flow of the fluid delivered by the orifices of Woilles so as to provide a control of the interaction of the fluids for a more effective mixing interaction.

Response to Arguments

11. Applicant's arguments with respect to claims 56-59, 65-83, 96-98 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

12. The prior art made of record previously cited and not relied upon is considered pertinent to applicant's disclosure. The following disclose delivery duct which have orifices which are configured to provide a desired introduction of fluid: Jacobsen et al 6478778, and Ayoub et al 5518700 discloses elongated fluid contactors with a non-uniform special/orientation distribution of the orifices.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tony G. Soohoo whose telephone number is (571) 272 1147. The examiner can normally be reached on 8AM-5PM, Mon-Thurs.

14. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David R. Sample can be reached on 571-272-1376. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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15. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Tony G Soohoo/
Primary Examiner, Art Unit 1797

Tony G Soohoo
Primary Examiner
Art Unit 1797